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ABSTRACT

The paper reviews the literature on early intervention programs with emphasis on programs for handicapped and at risk infants. The definition and goals of intervention for such infants are examined in relation to early childhood developmental characteristics. Studies demonstrating the effectiveness of early intervention for disadvantaged, handicapped, and at risk children are reviewed, providing the basis for a discussion of the crucial components of early intervention programs. Current as well as potential models of intervention are examined in relation to the role of generalization. A system approach to intervention with built in generalization training is suggested as an alternative to current generalization training procedures which have limited applicability for several reasons. (Author/SB)

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HANDICAPPED CHILDREN

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EARLY INTERVENTION PROGRAMS WITH HANDICAPPED CHILDREN*

Gerard M. Kysela, Kofi Marfo, and Sally Barros

The early years of infants' development (from birth to five years of age) have been the focus of much research into the identification of handicapping conditions and programs of intervention. The aim of this research has been the investigation of methods to stimulate development for children with identified handicaps or special needs. In fact, in the past fifteen years, a large number of early intervention programs for atypically developing children have emerged in North America (Bricker and Bricker, 1976; Gray and Klaus, 1965; Hayden and Haring, 1976; Horton, 1976; Klaus and Gray, 1968; Kysela, Daly, Doxsey-Whitfield, Hillyard, McDonald, McDonald, and Taylor 1979; Shearer and Shearer, 1976; Radin and Weikart, 1967; Ramey, Collier, Sparling, Loda, Campbell, Ingram and Finkelstein, 1976).

Programs have generally aimed at fostering optimum development and maturation in handicapped children by attenuating or reversing the typical developmental delays or by reducing the cumulative retardation which typically occurs with moderate to severe handicapping conditions. Initially, many of these early intervention programs involved children considered at-risk rather than children exhibiting more severe handicapping conditions likely to result in extensive developmental delays. Programs such as these for children identified as at-risk, have been advocated as, and proven to

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be viable as, preventive intervention measures (deLorenzo, 1976; Tjossem, 1976), whereas, the impact of such programs for more severely handicapped infants was more ambiguous.

In discussing the notion of intervention with young children in this chapter, we have referred to this process as early intervention. By way of definition, early is defined as that period of time during a child's development from birth, or as soon as potential handicapping conditions are identified after birth, until approximately five years of age. Within this time span, the critical age of focus for many early intervention programs is the period from birth to three years of age.

Intervention refers to the process of implementing a program designed to maintain or enhance the infant's development in a particular area of competence. In most instances with infants, intervention implies a parent-implemented process. The critical notion associated with intervention, however, is that some specific, direct and typically systematic program is initiated and maintained for infants exhibiting potential moderate or severe handicapping conditions or substantial at-risk factors. The intervention should facilitate a child's acquisition of skills or competencies in a particular area of development such as language or motor development; alternatively, this process may enhance the rate of the child's acquisition of particular developmental milestones.

Early intervention thus, attempts to reduce the progressive retardation (or cumulative deficiency) which is characteristic of the development and school performance of children with intellectual handicaps as well as children who experience environmental deprivation. With regard to

children brought up in deprived environments, Klaus and Gray (1968) noted that, "such children enter school at an initial disadvantage and, without special intervention, fall further behind as they go through the years of schooling" (p.1).

One reason for this initial disadvantage may be normative rates of development are not maintained (through provision of early intervention processes) prior to school entry. While this trend for a cumulative developmental deficiency is true of many moderate/severe handicapping conditions, the case of Down's Syndrome children appears even more intriguing and pronounced. Centerwall and Centerwall (1960) have shown that there is a characteristic decrease in the developmental quotient of Down's Syndrome children in their very early years. Thus, intervention should, if at all possible, begin as soon as the Down's Syndrome condition is identified and be aimed at attenuating or reversing the developmental delay these children typically exhibit.

The current prominence attached to early intervention thus results from the findings that progressive declines in developmental levels of Down's Syndrome children in particular, and disadvantaged or at-risk children in general, can be reduced by intensive pre-school intervention and stimulation. Recently, Ludlow and Allen (1979) have confirmed this finding demonstrating that developmental deficiency can be attenuated and in some cases reversed with the provision of early, sustained intervention. Kysela, Hillyard, McDonald and Ahlston-Taylor (1980) have also shown specific significant increases in mental and language development for moderate/severely handicapped infants as a result of participation in an intervention program.

In a remarkable demonstration of the impact of intervention upon mental development, Maisto and German (1979) documented the significant increase in mental functioning (Bayley developmental quotients) for more severely handicapped infants. The remarkable finding of the study was the significant effect of intervention when initiated with infants prior to eleven months of age (mean age = 6.78 months, S.D. = 2.63) as compared to initiation with infants after eleven months (mean age = 14.81 months, S.D. = 3.60). These studies thus support the contention that early infant intervention can have a substantial impact upon the cognitive and linguistic development of handicapped infants.

PROGRAM GOALS

More generally, goals for early intervention programs may include the following (Vulpe, 1977):

1. Providing the child with supportive relationships and interactions with adults within their relevant environments;
2. providing for appropriate standards and expectations for the child in terms of their present developmental levels relative to the levels of development they may attain;
3. attempting to assure that these expectations and standards are meaningful to the child.

With respect to these general goals, a number of studies have shown that structured developmental programs geared to specific goals and individual children's needs have generally been more successful in achieving the objectives; the primary objective included improvement of developmental functioning in the handicapped child (Hayden and Haring, 1976; Klaus and Gray, 1968; Radin, 1972; Radin and Weikart, 1967; Solkoff, Yaffe, Weintraub, and Blase, 1969).

Klaus and Gray (1968), in their report following a five year early training project for disadvantaged children, have shown that children receiving intervention tended to be consistently superior to children in a control group on tests of intelligence, language and reading. Although cognitive and academic skills have been the focus of much research, the effects of intervention have been studied in other areas as well. Solkoff et.al. (1969) studied the immediate and subsequent effects of handling on the behavioural and physical development of low birth weight infants. Their results indicated that the experimental infants who received the intervention procedures were more active and regained initial birth weights faster than control subjects who did not receive the extra handling.

A crucial component of many intervention programs has been the training of parents in teaching their own children (Bricker, and Bricker, 1976; Hayden and Haring, 1976; Klaus and Gray, 1968; Kysela et. al., 1979). The objective of these programs is to provide parents with specific and general skills in attempting to enhance their children's development. Parents' skills in handling and teaching their children have been shown to improve during early, parent-implemented programs (Bellamy, Dickson, Chamberlain, and Steinbock, 1975).

In examining the importance of parent training as a component of early intervention, Watson and Bassinger (1974) have suggested that parents are critical because of their capacity to provide intervention in the home, thereby, enhancing ecological validity (Brooks and Baumeister, 1977). Also, parents function as trainers to maintain gains which have been attained in out-of home programs. Radin and Weikart (1967) found that instructional programs could be

implemented within the homes of disadvantaged children with the active and enthusiastic participation of parents.

Indeed, experimental compensatory pre-school programs with a parent education component have been developed (Gray and Klaus, 1965) attaining positive results in terms of child gains as well as parent learning of intervention methods. Radin (1972) found that maternal attitudes changed in a desirable direction when mothers were offered maximum participation in a pre-school program as compared to being only moderately involved in such a program. In addition, infants of mothers offered maximum participation exhibited significant increases in subsequent IQ scores compared with infants whose mothers were only moderately involved in the program. Supporting this finding, Levenstein (1970) also obtained significant gains in verbal and general intelligence for children exposed to home-based stimulation through verbally-oriented play activities between the infants and their mothers.

It is interesting to note that even in cases where intervention programs have not intended to make deliberate changes in maternal behaviours, relationships between maternal characteristics and child's later development have been altered, presumably as a result of involvement in programming (Ramey, Farran, and Campbell, 1979). In fact, an earlier investigation by Klaus and Gray (1968) demonstrated that intervention programs succeeded in modifying the manner in which the mother and handicapped child related to one another following initiation of intervention. Both specific and non-specific effects in terms of parent interaction with the children have resulted from participation in early intervention programs by families, although additional research should delineate more precisely these family instruction effects.

The general goals for parents and care-givers providing early intervention may be summarized as including the following (Vulpe, 1977):

1. Assisting the parents to design an environment which enhances their child's development - given the families' unique characteristics;
2. providing support to the family that emphasizes the positive objectives that parents have achieved in teaching their infant and the parents' primary role in fostering their child's development;
3. assisting the parent to understand and maximize their child's developmental progress by providing parents with appropriate skills and activities to facilitate the child's development. Appropriate expectations with regard to the fate of their child's development and the ultimate ceiling of that development should also be established

In summary, early intervention programs seem to enhance children's development. The findings of Ludlow and Allen (1979), Kysela et. al. (1980), and Maisto and German (1979) have shown that early, intensive infant intervention, coupled with parental involvement can reduce or eliminate the typical decrease in developmental functioning seen with developmentally delayed children. An additional finding reported by Ludlow and Allen is that a greater proportion of Down's Syndrome children receiving early intervention were able to enter ordinary and private schools than those not receiving an intervention program. This study also revealed a positive change in parental attitude regarding their children's developmental potential. Several studies have demonstrated the improved intellectual performance of at-risk children involved in early intervention programs (Levenstein, 1970; Radin, 1972; Raimey et. al., 1979).

Screening.

At this point a note on the process of early screening as a method of detecting children with substantial developmental delays or handicaps should be mentioned. Other than specific conditions such as Down's Syndrome which have clearly identifiable characteristics at birth or soon thereafter, many handicapping conditions are difficult to identify in terms of their implications for developmental delay. In particular, predicting school achievement problems and intellectual development at ages 6, 7, and 8 is particularly difficult during the first 3-4 years of life. Frankenburg and his colleagues have provided some information regarding the use of pre-school screening for planning early intervention and predicting school problems.

In applying the Denver Developmental Screening Test (DDST) Camp, VanDoorninck, Frankenburg, and Lambie (1977) found that 90% of the children with abnormal scores on the DDST during pre-school years exhibited school achievement problems during their early years in school. However, as many as 35% of the children with normal results on the DDST also exhibited school problems at a later date. Although many complex issues are associated with problems of early prediction, one major problem is that traditional screening procedures emphasized biological predisposition, physiological integrity and past experiences as significant effects upon the child's development. These procedures have not paid attention to the important contemporary environmental factors which may be influencing the child's development.

The use of the Caldwell (1975) HOME Scale represents a significant development in this field as a potentially valuable device for screening important environmental factors. Recent developments in screening will hopefully include the refinement of developmental screening inventories such as the DDST as well as analysis of the family home environment applying such scales as the HOME. Through the use of these multiple measures of infant development with families, more adequate screening procedures will hopefully be developed to predict potential handicapping conditions for children. Thus the initiation of infant intervention should be facilitated for either a short or long-term program depending upon the severity of the handicapping condition and the number of developmental areas in which the child exhibits substantial delays.

A GENERAL SYSTEM OF INFANT INTERVENTION

Many advances have been made in the effort to institute early intervention programs. But, it is important to note that little integration of diverse methods employed in these programs has been attempted to promote more effective application of intervention strategies. As Kysela (1978) notes:

"although there are general descriptions of approaches taken to early intervention as well as very specific programs working on one or two behaviours, there are few general systems that are applicable to teach a broad variety of skills and competencies to infants and young children; nor are general models of parent training available to enable the parents of very young infants and toddlers to teach their children these very important concepts and skills" (p.viii,1978).

Glaser (1976) has emphasized the importance of linking the conceptual basis of program development with the practice of education. This linkage provides a connection between present knowledge of learning principles and concepts of child development and the basis for instruction in a broadly applicable intervention system. Such a generalized system should provide an intervention program covering a broad range of developmental objectives and be useful to parents and families in their natural environments.

The Early Education Program (Kysela et. al., 1979) incorporated two separate but complementary intervention models in an attempt to meet some of these needs: the home based program and the school based program. The home based program served developmentally delayed children from birth to 2½ years in their home environments. Intervention was carried out by the parents with support from home specialists who provided parent-training and program assistance on a weekly basis. The school based program accommodated developmentally delayed children from 2½ - 6 years. Instruction was provided by two teachers and two developmental assistants in an elementary school setting. In order to accommodate these two models, four requirements had to be met:

1. The need for home-school based program as opposed to an institutional program;
2. the need for a systematic approach to intervention;
3. the development of generalizable parent teaching skills;
4. development of teaching methods for children with moderate/severe handicaps, including modes of increasing the transferability of new skills.

Direct and incidental teaching methods were developed to meet the four requirements listed above from both the functional (practice of education) and conceptual bases identified by Glaser (1976).

Functionally, a test-teach method was necessitated by the following factors. Due to the severe degree of retardation the children exhibited and the cumulative effect of developmental delay, a systematic intervention method was required rather than a less structured, uncontrolled method. Also assessment and teaching need to be closely correlated to ensure a high degree of assessment validity in relation to teaching. Thirdly, a data-based method for monitoring the child's performance was required to determine when a criterion was attained or programs needed to be revised.

From a conceptual standpoint, Glaser (1976) outlined four components which were essential when designing instructional environments:

1. The analysis of competence to be achieved;
2. description of the initial state when learning begins;
3. conditions that can be implemented to bring about change from the initial state of the learner to the state described as the competence;
4. assessment procedures for determining the immediate and long range outcomes of the conditions that are put into effect to implement change (Glaser, 1976, p. 8).

These components closely parallel Bijou's (1976) description of characteristics essential for optimal early intervention:

1. Specify goals of teaching and learning in observable terms;
2. begin teaching at child's level of competence;
3. arrange teaching to facilitate learning;
4. monitor learning progress and make changes to advance development;
5. use practices that generalize, elaborate and maintain behaviors.

The direct test-teach model, the incidental teaching model, and the curriculum in the Early Education Program (Kysela, 1978; Kysela et. al.,

1979) were attempts to operationalize each of these components in order to optimize instruction and learning for the child.

The first two components mentioned by Glaser (1976), the analysis of competency and description of the initial learning state, were achieved in the Early Education Program by the organization of the teaching curriculum into a series of behavior targets and objectives. A criterion referenced assessment format (Snelbecker, 1974) was used to determine the initial skill level of the child within the curriculum. Further, the criterion referenced assessment had a direct relationship to the teaching model by specifying the starting point of instruction.

The specification of conditions to bring about a change from the initial state of assessment to the state of competence (Glaser's third component) was carried on through both the direct and incidental teaching models. In the direct model, antecedent and consequent determinants of change were arranged for specific instructional programs similar to the procedures of Martin, Murrell, Nicholson, and Tallman (1975) and based upon Skinner's analysis of behavior change for teaching (Skinner, 1953; 1968). (For further details of the direct teaching model see Kysela et. al., 1979). The same prompts, guidance, shaping and fading procedures were incorporated into an incidental teaching model; however, this model could be implemented quite informally by parents or significant others in a variety of situations to facilitate generalization of newly acquired skills and concepts (Kysela et. al., 1979).

The last component required by Glaser in designing an instructional environment, that of measurement of change procedures, was built into the

direct teaching model by the inclusion of a data collection system. This information provided both for a fine-grained analysis of the children's progress in a particular program as well as a more global picture of the child's progress across all programs.

Further, normative assessments of the children's progress were carried out at periodic intervals to provide an additional measure of the long range outcomes of the intervention procedures. These normative results strongly supported the positive effects of the intervention program upon the children's development. Assessment of the incidental teaching model was more difficult, with no readily available instruments to measure generalization. However, this very important area is currently being investigated. That is, an essential question regarding the benefits of early intervention asks to what degree the skills and knowledge the child acquires through this process are applied in other facets of the infant's functioning; exactly what degree of generality and applicability do the child's new skills and knowledge attain?

THE ROLE OF GENERALIZATION

As was mentioned earlier, many early intervention programs are now employing systematic approaches to parent training and child teaching in order to provide a broad range of options for parents to facilitate their children's development. In fact, this approach should facilitate generalization of the child's newly acquired knowledge. Thus, a major characteristic of early intervention could be realized (Bijou, 1976); i.e. following practices that generalize, elaborate, and maintain behaviors acquired by the child through the intervention process.

Previously mentioned programs seem to adequately cover four of the issues described by Bijou's five characteristics essential for optimal early intervention. However, the issue of generalization continues to be a major problem in determining the impact of early intervention regarding the child's application of knowledge to novel aspects of the environment.

One common definition of generalization suggested by Stokes and Baer (1977) is as follows: "the occurrence of relevant behavior under different, non-training conditions: i.e. across subjects, settings, people, behaviors and/or time without the scheduling of the same events or conditions as had been scheduled in the training conditions" (p. 350). This definition of generalization points out the critical dimensions of this phenomenon: namely, the occurrence of the behavior in non-training situations and secondly, the absence of the same events which were employed or scheduled during the intervention and training process (Drabman, Hammer, Rosenbaum, 1979). Thus, generalization typically refers to the occurrence of specific behaviors under new conditions or the occurrence of new behaviors which are similar to learned behaviors under the same or similar stimulus conditions. That is, generalization can be either the expansion of situations in which the same responses occur or the expansion of the responses occurring in similar situations.

With respect to most intervention programs, there appear to be several major reasons for the lack of generalization of skills under normal conditions (Walker and Buckley, 1972). First, generalization is unlikely to occur if programs are withdrawn without fading of procedures which were

employed during the instructional contingencies. However, with respect to this problem, it is essential to identify the experimental contingencies which are being employed in the intervention process and to make sure these are then slowly faded throughout the training program.

Secondly, generalization is unlikely to occur if the environment to which the individual returns is not replanned and programmed to support the newly acquired skills or competencies. Thus, in a number of non-training situations, extinction conditions may exist in which the child may attempt responses with minimal reinforcement (Harris, 1975). This would necessitate an assessment of reinforcement schedules in the training environment and other natural environments in which the child lives, in order to plan an appropriate schedule of reinforcement to support newly acquired behavior.

Thirdly, generalization may be minimal as a result of the presence of specific conditions in the training environment which are simply unavailable in other situations. An example of this problem was demonstrated by Handelman (1979) in which the effects of a single vs. several alternative settings in a school environment for training were assessed. Considerably more generalization was obtained as a result of these multiple training settings. In addition, more than one trainer may be important in establishing generalization of skills taught through direct intervention (Stokes, Baer, Jackson, 1974).

A parent-implemented, home-based intervention program with infants may indeed possess a number of characteristics which overcome these problems interfering with generalization. First, by employing direct instructional programs which systematically fade the amount of parental support in

intervention, fading the environmental instructional procedures may be an automatic process.

Secondly, with parents as implementers of the program, the generalization of procedures to various aspects of the child's environment should become an automatic part of intervention. As well, by training the parents, siblings, and other family members in procedures such as incidental teaching, it is increasingly likely that the specific conditions in training will be supported by persons, settings and other events that the child encounters; this is especially true if significant adults and other persons use incidental procedures to assist the child in responding to these novel situations. Indeed, a common approach to intervention including systematic involvement of family and significant others should optimize the conditions for generalization.

In an extensive review of the generalization literature, Stokes and Baer (1977) differentiated between nine categories of generalization training procedures under which the literature reviewed could be categorized. These nine categories provided direction in terms of potential areas of training and investigation to determine optimal methods of planning for generalization. Within the area of infant intervention programs each of these nine categories provide a structure from which to review methods used in programs as well as direction for future program development if their suitability and efficacy for generalization can be determined. The first category, Train and Hope, represents the most common approach to generalization training which would be exemplified by providing a center-based, pre-school intervention for young infants without any parent training and hoping that the skills and competencies the infant

acquired in the pre-school program would generalize to the home. This method of course would be fraught with many of the risks described earlier (Walker and Buckley, 1972).

The second category, Sequential Modification, involves the expansion of the same training contingencies from the instructional setting to other settings where generalization is not occurring. Thus, if effects from a center-based program are not occurring at home then specific training would be implemented at home through an infant intervention program. This method represents a rather expensive and time consuming process. The third category, the use of Naturally Maintaining Contingencies, would include for example the selection of specific instructional skills for intervention that are likely to be reinforced and maintained by factors in the natural environment. Teaching children to ask for edibles, to ask questions which require answers from significant adults, or to respond directly to social questions are much more likely objectives to be maintained by the natural environment than learning to identify objects which are not found in the immediate environment. This approach would have a high degree of ecological validity and certainly seems to be an important component to include in early intervention programs.

The fourth category described, Training Sufficient Exemplars, involves the provision of a wide range of examples of a particular concept being taught in order that the child attains a level of concept mastery that will be applicable to a broad range of instances of the concept or skill. This procedure would increase, potentially, the likelihood of appropriate discriminations being made between examples and non-examples of concepts and skills a child is acquiring in the program. A fifth

category, described as Training Loosely, involves a minimum of control over the stimuli and responses in order to maximize the learner's chances of trying various alternative responses to obtain the correct response or acquire the appropriate concept. With respect to early intervention programs, it would seem appropriate to begin with more restricted direct instruction initially and to gradually reduce the restrictions in terms of this category.

The sixth category described by Stokes and Baer involves the use of Indiscriminable Contingencies. That is, through the use of delayed, intermittent, and unpredictable reinforcement schedules, learned skills and concepts are much less likely to be extinguished from the child's repertoire. These procedures are very important in increasing the persistence of responses by the child after initial training. The seventh category, Programming Common Stimuli, suggests that the same examples and events available throughout the child's environment be used as stimuli in the training situation. Common physical events (such as furniture), siblings, and materials available in the natural environment should facilitate planning for generalization. By implementing early intervention in the home, the likelihood that these common events are present in many different situations is certainly maximized.

Procedures to Mediate Generalization is the eight category described by Stokes and Baer (1977). These procedures include self-instruction and self-reinforcement methods which can facilitate generalization. In terms of early intervention programs, responding with self-initiated interactions for communication, motor skills, and conceptual knowledge provides one avenue for increasing the likelihood of mediating generalization to a number of

different situations. That is, the child's self-initiation of contact with adults through verbal communication provides a mechanism or response system which can be generalized to a broad variety of situations; the child, thus, has an opportunity to express his/her needs spontaneously. The reinforcement and maintenance of self-initiated expression may be a very important method of mediating generalization in a number of home situations.

The ninth category, Training to Generalize, involves teaching the learner to apply acquired skills to a broad range of situations and then expecting occurrence of that skill in new situations. The use of procedures such as the mand-model procedure for prompting language usage (Rogers-Warren and Warren, 1980) and incidental teaching described by Kysela et.al. (1979) attempt to provide mechanisms for facilitating this process. This incidental teaching procedure was extended from the milieu teaching model developed by Hart and Rogers-Warren (1978). The mand-model procedure developed by Rogers-Warren and Warren (1980) provided a program component in addition to direct language instruction, designed to enhance generalization of newly acquired language skills. Data from this study suggested increased generalized language responses occurred in free play for the three pre-school aged children following the initiation of the mand-model procedure. This effect was demonstrated through the use of a multiple baseline design.

Another method of generalization training was to establish the expectancy by the adult for the child to respond; this was described by Haley, Marshall, and Spradlin (1979). In their study, the authors advocate the use of a time delay to increase language use in generalization. They

point out that retarded individuals are often given what they want or need without being required to use language or self-initiated responses which are in fact in their repertoire.

In requiring retarded institutionalized persons to ask for their food trays before meals, the authors instituted a delay procedure of fifty seconds waiting for the child to respond correctly. The delay process seemed to facilitate generalization across meal times and servers of meals. Thus, this procedure would be another means of enhancing the child's generalization tendencies. The development of additional methods such as those for Train-to Generalize strategies seems to be an appropriate direction for future research, particularly in terms of early intervention processes.

However, it is conceivable that the provision of a specific sequence of training steps from initial acquisition to generalization for settings outside of treatment, and finally to maintenance of change over time (Koegel and Rincover, 1977) may have a built-in disadvantage. That is, early intervention programs which specifically teach a skill or competency first and then teach to generalize for alternative environments, may be inhibiting the generalization process from the very beginning.

In contrast, the discrimination learning procedures, developed over many years of research, initiate the discrimination process typically from the beginning of training. That is, the learner's responsibility includes discriminating between examples and non-examples of the concept from very early stages of learning. However, in the generalization procedures typically employed in intervention studies, initial training occurs without generalization; generalization being initiated after mastery of a new skill or concept. It may

be too difficult at this point in learning to provide for relatively smooth generalization to alternative settings without extensive re-training. Thus, it would seem more appropriate to provide for a system of intervention which attempts to develop generalization of responses from the early phases in learning.

It may be more effective to provide instructional models which employ teaching procedures for specific learning of a new skill or concept, and for generalization and elaboration of that skill or concept to a number of different settings at the same time. Perhaps it is necessary to develop other systematic approaches which combine instructional methods of a structured, direct teaching nature with generalization procedures that are employed at the very beginning of intervention with the infant. In addition, the provision of intervention in the natural environment may ensure a high degree of ecological validity (Brooks and Baumeister, 1977) as well as enhancing the likelihood of generalization by the infant to a broad number of environmental settings.

It seems important at this time to evaluate these systems' approaches to early intervention which may have a broad impact on the infant's functioning. As well, a comparison of these methods of intervention with some more specific methods of training for generalization may aid in identifying the most effective methods in terms of learning adequate communication, exploratory, cognitive and motor skills. Finally, a method of intervention that is relatively efficient in terms of cost effectiveness for the family and the infant also needs to be identified. That is, it seems that some of the points identified by Stokes and Baer are rather specific and may be in fact limiting in their applicability due to the necessity of following up specific training procedures with generalization training.

A systems approach to applying the behavioral intervention process may have built-in generalization training from the very beginning of intervention and facilitate the generalized development of skills and concepts by the infant. Future comparative studies addressing these issues should provide more critical analyses and directions for program development.

- Becker, W.C., Engelmann, S.E., and Thomas, D.R., Teaching 1: Classroom management. Palo Alto: Science research Associates, 1975.
- Bellamy, G.T., Dickson, A.S., Chamberlain, P., and Steinbock, E., Evaluation of parent training as a method of increasing skill acquisition by a Down's Syndrome infant. Mental Retardation (Amer.), 1975, 13 (3) 43.
- Bijou, S.W. Child Development: the basic stage of early childhood. Englewood Cliffs, NJ. Prentice Hall, 1976.
- Bricker, W.A. and Bricker, D.D. The Infant, toddler and pre-school research and intervention project. In T.D. Tjossem (ed.) Intervention strategies for high-risk infants and young children. Baltimore: University Park Press, 1976, pp. 545 - 572.
- Brooks, P. H. and Baumeister, A.A. A plea for consideration of ecological validity in the experimental psychology of mental retardation: a guest editorial. The American Journal of Mental Deficiency, 1977, 81, 407-416.
- Caldwell, B.M. Instruction manual: Home Observation for Measurement of Environment (H.O.M.E.), Revised Edition, Little Rock: University of Arkansas, Center for Early Development, 1975.
- Camp, B.W., Van Doorninck, W.J., Frankenburg, W.K., and Lambie, J.M. Preschool developmental testing in prediction of school problems. Clinical Pediatrics, 1977, 16, 257-263.
- Centerwall, S.A. and Centerwall, W.R. A study of 60 children with mongolism reared in the home compared with those reared away from home. Journal of Paediatrics, 1960, 25, 678.
- de Lorenzo, E.G.E. Latin American perspective, In T.D. Tjossem (Ed.) Intervention strategies for high risk infants and young children. Baltimore: University Park Press, 1976, pp. 737-746.
- Drabman, R.S., Hammer, D. and Rosenbaum, M.S. Assessing generalization in behaviour modification with children: The generalization map. Behavioural Assessment, 1979, 1, 203-219.
- Glaser, R. Components of a psychology of instruction: toward a science of design. Review of Educational Research, 1976, 46, 1-24.
- Gray, S.W. and Klaus, R.A. An Experimental pre-school program for culturally deprived children. Child Development, 1965, 36, 887-898.

Halle, J.M., Marshall, A.M., and Spradlin, J.E. Time delay: A technique to increase language use and facilitate generalization in retarded children. Journal of Applied Behaviour Analysis, 1979, 12, (3), 431-439.

Handelman, J.S. Generalization by autistic-type children of verbal responses across settings. Journal of Applied Behaviour Analysis, 1979, 12 (2), 273-282.

Harris, S.L. Teaching language to nonverbal children with emphasis on problems of generalization. Psychological Bulletin, 1975, 82 (4), 565-580.

Hart, B. and Rogers-Warren, A.G. A milieu approach to teaching language. In R.L. Schiefelbusch (Ed.), Language Intervention Strategies, Baltimore, University Park Press, 1978.

Hayden, A.H. and Haring, N.G. Early Intervention for high risk infants and young children: Programs for Down's Syndrome children. In T.D. Tjossem (ed.) Intervention strategies for high risk infants and young children. Baltimore: University Park Press, 1976, pp. 573-608.

Horton, K.B. Early intervention for hearing-impaired infants and young children. In T.D. Tjossem (ed.) Intervention strategies for high risk infants and young children. Baltimore: University Park Press, 1976, pp. 371-380.

Klaus, R.A. and Gray, S.W. The early training project for disadvantaged children: A report after five years. Monographs of the Society for Research in Child Development, 1968, 33 (4).

Koegel, R.L. and Rincover, A. Research on the difference between generalization and maintenance in extra-therapy responding. Journal of Applied Behaviour Analysis, 1977, 10 (1), 1-12.

Kysela, G.M. The early education project. Report of Alberta Education, Planning and Research Division, Edmonton, Alberta, 1978.

Kysela, G.M., Daly, K., Doxsey-Whitfield, M., Hillyard, A., McDonald, L., McDonald, S., and Taylor, J. The early education project II. In L.A. Hamerlynck (Ed.) Behavioural Systems for the Developmentally Disabled: I. School and family environments. Bruner mazel, Inc., 1979, pp. 128-171.

Kysela, G.M., Hillyard, A., McDonald, L., and Ahlston-Taylor, J. Early intervention: design and evaluation. In R. Schiefelbusch and D.D. Bricker (Eds.) Early language: acquisition and intervention. Baltimore: University Park Press, 1980.

Levenstein, P. Cognitive growth in preschoolers through verbal interaction with mothers. American Journal of Orthopsychiatry, 1970, 40 (3), 426-432.

Ludlow, J.R. and Allen, L.M. The effect of early intervention and pre-school stimulus on the development of the Down's Syndrome child. Journal of Mental Deficiency Research, 1979, 23 (1), 29-41.

Maisto, A.A. and German, M.L. Variables related to progress in a parent infant training program for high-risk infants. The Journal of Pediatric Psychology, 1979, 4, 409-419.

Radin, G. Three degrees of maternal involvement in a preschool program: Impact on mothers and children. Child Development, 1972, 43, 1355-1364.

Radin, N. and Weikart, D. A home teaching program for disadvantaged preschool children. Journal of Special Education, 1967, 1 (2), 183-187.

Ramey, C.T., Collier, A.M., Sparling, J.J., Loda, F.A., Campbell, F.A., Ingram, D.L. and Finkelstein, N.W. The Carolina Abecedarian Project: A longitudinal and multidisciplinary approach to the prevention of developmental retardation. In T.D. Tjossem (Ed.) Intervention strategies for high risk infants and young children, Baltimore: University Park Press, 1976, pp. 629-668.

Ramey, C.T., Farran, D.C. and Campbell, F.A. Prediction IQ from mother-infant interactions. Child Development, 1979, 50, pp.804-814.

Rogers-Warren, A. and Warren, S.F. Mands for verbalization: Facilitating the display of newly trained language in children. Behavior Modification, 1980, 4, 361-382.

Shearer, D.E. and Shearer, M.S. The portage project: a model for early childhood intervention. In T.D. Tjossem (Ed.) Intervention strategies for high-risk infants and young children. Baltimore: University Park Press, 1976, pp. 335-350.

Skinner, B.F. Science and human behaviour. New York: MacMillan, 1953.

Skinner, B.F. The technology of teaching, New York: Appleton-Century-Croft, 1968.

Snelbecker, G.E. Learning theory, instructional theory, and psycho educational design, New York: McGraw-Hill, 1974.

Solkoff, N., Yaffe, S., Weintraub, D., and Blase, B. Effects of handling on the subsequent development of premature infants. Developmental Psychology, 1969, 1 (6), 765-768.